SOUTH AFRICAN FISHES,

BY

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The following contribution to our knowledge of South African fishes contains a description of three new genera and four new species.

I have to express my obligation to Mr. G. A. Boulenger, F.R.S., of the British Museum (Nat. Hist.) for his ready

assistance and advice in the work.

The following is a list of the fish described:-

1. Choridactylodes natalensis, n.g. et n.sp.

2. Astronesthes boulengeri, n.sp.

3. Melanonosoma acutecaudatum, n.g. et n.sp.

4. Paraliparis australis, n.sp.

5. Paralichthodes algoensis, n.g. et n.sp.

6. Solea capensis, n.sp.

7. Branchiostoma capense, n.sp.

1. CHORIDACTYLODES, n.g.

Brianchiostegals six. Body, but not head compressed, a groove in the occiput. Bones of head with osseous ridges; preorbital, preopercle and opercle with spines. A single dorsal fin with more spines (14-15) than rays (8-9); anal with 2 spines; pectoral fins with three free rays inferiorly, and with the upper ray prolonged into a hair-like filament; ventrals with one spine and five rays, articulate fin rays branched, scales absent; skinny appendages on the body.

This genus is most closely related to *Choridactylus*, Richardson, but differs from it in the number of spines, having one more spine in the dorsal as a rule, but distinctively in the possession of the hair-like prolongation of the upper ray of the

pectoral.

CHORIDACTYLODES NATALENSIS, n.sp

(Plate V.)

Br. 6, D. XIV-XV+8-9, A. II, 9, V. I+5, P. 8+III.

Length of head $4\frac{1}{2}$, pectoral $4\frac{1}{2}$, caudal 5, height of body $3\frac{1}{2}$

in length of body.

Diameter of eyes $3\frac{1}{3}$ in length of head, a little less than interorbital space and $1\frac{1}{3}$ in distance from end of snout. Interorbital space deeply concave with two ridges, one at each side, forming a lenticular hollow over each eye; a single transverse ridge separates the interocular space from the deep

occipital groove.

Four faint ridges cross the occipital groove, two at each side, and these are continued backwards on the humeral region in the form of blunt spines, enclosing a triangular space with a pit-like depression in its centre. Another blunt spine occurs on the humeral region, just above the pectoral. Preorbital has a sharp spine, which in most specimens stands out from the head almost at right angles to it. Its length is about equal the diameter of the eye and it has at its base a smaller spine projecting forward. A ridge of blunt spines runs from the base of the larger spine to the spine (11) diameter of eye) of the preoperculum from whence another ridge, with four blunt spines passes obliquely forward and downwards to the angle of the mouth; the operculum has three blunt spines. There is a tasselated tentacle over the centre of the eye and two on each jaw, the anterior being the larger.

Teeth villiform, in jaws not on vomer or palatine. The dorsal fin has, with one exception out of six examples, 14 spines and 8 rays. In the exception, there are 15 spines and 7 rays. The pectoral (8 + 111) is rounded and emarginate, having three free rays at its base and a long hair-like prolongation of the first ray reaching to the end of the spinous dorsal. Ventrals attached to body from $\frac{3}{4}$ of their length, black. Anal, black, with white tips to rays, except last

four.

The colour varies very much from an almost uniform dark brown to brown and white as shown in the figures. The white band across the caudal is, however, always present. The only parts showing a different colour are the free rays of the pectoral, which are yellowish.

Fleshy filaments on dorsal and pectoral fins and on the body which also has a row of long fleshy filaments (about 9)

along the region of the lateral line.

The fish were only found on two occasions, viz.—two on 25th March, 1901, $2\frac{1}{2}$ miles off the Umhlanga River mouth in 22-26 fathoms of water with a bottom of fine sand, and five on the same day and near the same place (Cape Natal Light House bearing S.W. $\frac{1}{2}$ W. (mag), distant 8 miles); depth, 22 fathoms, bottom, fine sand. On both occasions the shrimp trawl net was used and was over in the one case for 2 hours and in the other 40 minutes. In none of the other numerous hauls on the Natal or Cape Colony Coasts were specimens found.

ASTRONESTHES BOULENGERI, n.sp.

(Plate VI.)

Br. 18, D. 16, A. 15, V. 7, P. 8.

Length of head nearly 5 times in length of body without caudal, its depth nearly 8 times. Depth of body a little more than depth of head. Barbel at least half the length of the head, but probably longer, as it has apparently been damaged. The opercular apparatus is incompletely developed. Near its upper angle a part of the margin is produced backwards as a small lobe.

The dentition is well developed. There are two large curved canines, which, when the mouth is closed, project beyond the margin of the median line of the head. Inside of these towards the symphysis of the jaw is a smaller canine, that of the upper jaw being somewhat larger than that of the lower. At the symphysis there is both in the upper and lower jaws a small bony projection of a triangular shape. Extending backwards from the large canines along the premaxillary and dentary are rows of unequal, very sharp teeth, three in the former, five in the latter. There is a small tooth, scarcely projecting beyond the skin, outside and a little behind the upper large canines, and two small teeth almost on the outer side of the dentary and near the middle of its length. The maxillary is beset with fine unequal and closely set serrations along the distal half of its lower margin. On each palatine is a row of five teeth, small and widely set apart. There are no teeth on the tongue.

The first dorsal is long, originating a little behind the vertical from the ventral and ending slightly in front of the vertical from the origin of the anal. As this and all other fins have been damaged, the length of the rays cannot be determined with certainty. The ventrals are placed near the middle of the body, but a little nearer the head than the root of the caudal. The pectorals are situated

close behind the gill opening. The anal fin commences close behind the anus and under the posterior extremity of the dorsal, ending immediately in front of the supra-caudal luminous gland. There is a small pit in front of the anus. A dorsal adipose fin occurs about half-way between the end of the dorsal and the beginning of the caudal. Its base is about ½ the vertical diameter of the eye, and its free portion reaches to the supra-caudal gland. A ventral adipose fin, very similar to the dorsal though smaller, is also present. The base of attachment is very slightly longer, the free portion, however, being markedly shorter. Both are coloured similarly, being dark brown at the base with brown dots towards the margin.

Phosphorescent organs: These may be divided into three categories. 1st, minute pearl-shaped spots scarcely visible to the naked eye. These are scattered like a cloud of specks over the body and head, showing no regular arrangement, except on the ventral median line, where there are two rows running along the whole length of the body, interrupted only by the luminous glands at each side of the anal fin and by the sub-caudal luminous glands. They also form a ring around the lower half of the orbit and a line inside the margin of the mandible and part of the opercular edge. 2nd, larger pearl-shaped spots quite visible to the naked eye and arranged in rows chiefly along the ventral surface of the body. Their distribution is as follows: 20 alternating with the bases of the 18 branchial rays, 21 between the isthmus and the ventral fin, forming a line bent outwards towards the pectorals at the 7th and inwards at the 18th, where another double series begins, passes backwards between the ventrals and proceeds in 2 almost parallel rows towards the tail, ending in front of sub-caudal gland. They are not interrupted like the line of smaller spots by the glands at either side of the anal fin, but pass on the outer side, though very close to them. spots in this line number 35. External to this, and almost on the side of the body, are two more prominent lines of spots running in an almost straight line from about the middle of the opercular opening backwards as far as the 3rd ray of the caudal and numbering 35 in all. At the anterior end of this series there is a single spot on the operculum at the base of the small lobe already mentioned. The only other luminous spot on the head region is one situated immediately under the eye. It appears as a small protuberance of the dark skin, which, however, when drawn up is found to cover. like an eyelid, a pearl-shaped organ similar to the others. Five openings, probably glandular, occur along the inferior margin of the lower jaw, devoid of the pearl-shaped organ. 3rd, glandular organs, probably luminous in function. When the fish was taken, these appeared as gelatinous pinkish

patches, now (in spirit) white and of a spongy-looking texture. They are slightly elevated above the surrounding surface of the skin, which can, however, be readily traced passing over them. Their distribution is as follows: One above the caudal region between the dorsal adipose fin and the tail and another in front of this, between the adipose fin and the posterior end of the dorsal, one, slightly divided into two by a median line, on the sub-caudal region between the anal fin and the tail, and two on each side of the anal fin. Three much smaller roughly circular patches occur on the side of the body between the ventrals and anal, about \(\frac{1}{3}\) the diameter of the eye. Two smaller streaks, apparently of the same kind of tissue, occur on the ventral surface behind the ventrals; they are not symmetrically placed, the right being nearer to the ventral fin than the left by about its own length.

The loose scaleless skin is very dark brown, almost black, tinged with a bronzy lustre on the postorbital region of the

head.

Only one specimen of this fish was obtained. Locality, Cape Point Light-house bearing S. 83° E. (mag), distant 35½ miles, depth, 360 fathoms. Procured by shrimp trawl.

A much-damaged fish, however, was obtained, 60 mm. in length by shrimp trawl on the East Coast (Buffalo River N.W. by W., distant 21 miles); depth, 490 fathoms, bottom, sand. The dentition and shreds of dark skin seem to indicate that it belongs to the same species. The barbel, which is undamaged in this fish is long, reaching well beyond the posterior extremity of the lower jaw and has a flattened terminal portion. The dorsal has apparently 14 rays however.

Measurements of first specimen.

Length of body (without caudal)	213	mm.
Depth ", "	35	,,
Length of head	45	,,
Depth ", ",	32	,,
Vertical diameter of eye	10	, ,,
Length of barbel	20	(+?) "

MELANONOSOMA, n.g.

Head quadrilateral, body compressed, especially towards caudal region, which terminates in a long tapering tail. Mouth wide, anterior and lateral. Both jaws with narrow bands of villiform teeth; teeth on vomer and palatines. No barbel. One long undivided dorsal fin commencing over the pectorals and ending a short distance in front of the caudal rays. One anal, commencing about the middle of the body, similar to the dorsal, not confluent with caudal rays, though separated from them by a short space. Pectorals and ventrals narrow, in the same vertical line. No pseudo-branchiae.

Very near to the genus *Melanonus* Günther, but has not the anterior division of the dorsal described by him. The "posterior division" of the dorsal and anal are present as in his description of Melanonus, but as these are here regarded as part of the caudal the present genus is described as having one dorsal and one anal.

MELANONOSOMA ACUTECAUDATUM, n.sp.

Br. 7. D. 66. A. 49. V. 5.

Length of head nearly 63 in length of body. Depth of head and body nearly equal, contained 71 times in length of body. Diameter of eye 4 times in length of head. The dorsal commences at a point in the vertical from the pectoral and ventral, and consists of feeble rays bound together by a very delicate membrane, the longest occurs in the anterior part, and is a little more than half the length of the head. anal commences immediately behind the anus and under the 21st ray of the dorsal. It is similar to the dorsal though more delicate, and its longest rays are only about half the length of those of the dorsal. The posterior rays of both dorsal and anal overlap the small caudal rays, reaching to about the 3rd or 4th when laid along the body. There are about 50 rays in the caudal, four of the posterior median are prolonged, being longer than the longest dorsal by about a \frac{1}{3} of its length. The caudal region bears a very close resemblance to that of Melanonus. A series of 5 scales between the dorsal and lateral line and o between lateral line and ventral median line. A large mucous pore immediately above the eye and many smaller ones scattered over the upper surface of the head; about 5 large pores under the orbit, three under the mandible. The colour of the fish is an uniform dark brown.

It was procured by shrimp trawl off the Cape Peninsula (Cape Point Light-house bearing S. 83° E. (mag.) distant $35\frac{1}{2}$ miles); depth, 360 fathoms, bottom, black specks. Only one specimen has as yet been got.

Measurements of specimen.

Head, length 16 mm. Longest ray of dorsal 9 mm.

" depth 11 " " " " " caudal 12 "

Body, length 85 " " " " " anal 5 "
" depth 11 " Eye 4 " .

PARALIPARIS AUSTRALIS, n.sp.

(Plate VII.)

D. 48. A. 43. P. 14 + 3. C. 9.

Height of body contained $3\frac{3}{3}$ times in length without caudal. Length of head over 4 times. Snout broad, truncated, longer than diameter of eye, which is $3\frac{1}{3}$ in length of head. Interocular space is greater than postorbital portion of head and is 2½ times the diameter of the eye. No rays in space separating the two portions of the pectoral. Nostril immediately in front of eye, about 6 mucous pores in a line along the side of upper jaw and under eye. Two occur at symphysis of lower jaw, close together, having one external opening. A row of 5 extending along lower jaw and opercular region to the narrow gill opening; the last opposite the gill opening, is much smaller than the others. Teeth of upper and lower jaws in closely set pavemented band. The origin of the dorsal is behind the base of the pectoral, and that of the anal below the 6th ray of dorsal. Length of middle caudal ray $7\frac{2}{3}$ in length of body, the dorsal overlaps the caudal more than the anal and to about $\frac{1}{4}$ of the length of the caudal. No trace of a ventral fin. The vent as seen in the smaller and uninjured specimen is far forward, just behind a line between the pectorals.

Skin is very loose and scaleless. The larger specimen appears to be colourless, with the exception of the eye and visceral mass, which are black. Examined with a low power, however, the loose skin and body under it are seen to be speckled with minute black dots. In the smaller these are distinctly visible to the naked eye as a somewhat dark colouring, most marked along the whole dorsal region.

The specimen appears to represent a new species, as it differs in fin formula and has no trace of rudimentary rays between the division of the pectoral. In view of the comparatively small size (50 mm.) as against 200 of the mature specimen secured and described by Collet, and the $7\frac{1}{2}$ inches of that described by Günther, it might be considered an immature form of $P.\ bathybins$. It has, however, the ovaries well developed, with large eggs, which are apparently ripe, being about 1 mm. in diameter. The mouth of one of the specimens was filled with crushed schizopods, a fact probably

indicating a pelagic habit.

The number of known species of the section of the Discoboli without ventral disc the genus Paraliparis in the wider sense) is limited. P. bathybius has been obtained near Bear Island in 658 fathoms, and by the "Knight Errant" at Station 8, 1882, in 640 fathoms; P. laparinus has been obtained by the "Fish Hawk" at several stations near 39° N. lat., 70° W. long., at depths between 300 and 600 fathoms. P. copei at about the same locality and depth, and P. membranaceus (one specimen) by "Challenger" off Cape St. Vincent from 40 fathoms The occurrence of a representative at the Cape of Good Hope considerably widens the distribution of this interesting group of fishes. The two specimens were obtained by shrimp trawl, 40 miles W. by N. of Table Mountain at a depth of about 300 fathoms. The larger had the abdominal cavity considerably injured; the smaller was little injured.

PARALICHTHODES, n.g.

Dorsal fin commences before eye on the snout, anterior rays branched and separate. Eyes on the right side. Teeth very small and in several rows. No teeth on vomer or palatines. Lateral line curved strongly. Scales not ciliated. Strong anal spine. Ventrals unsymmetrical, right in front of left and in the median line.

Nearest to Paralichthys (Girard in U.S. Pacif. R.R. Exped.

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PARALICHTHODES ALGOENSIS, n.sp.

(Plate VIII.)

D. 72. A. 52. V. 6. L. 1. 118+8.

Body moderately elongate, its height contained in its length without caudal) over $2\frac{1}{2}$ times, head a little over $4\frac{1}{3}$ times. Breadth of tail $2\frac{2}{3}$ same as in head. Eyes on the right side, lower

very slightly in advance of upper. Teeth small and in 3 more or less distinct series in upper and lower jaw. Lower jaw projects beyond upper by about \frac{1}{2} the vertical diameter of the eye. Maxillary of left side more exposed than that of the right; the latter extends backwards beyond the centre of the lower eye. Longitudinal diameter of eye greater than vertical diameter and a little less than twice the interocular space. The dorsal fin originates on the snout nearer to its anterior extremity than to the eye, the first ray is inserted a little to the left of the median line, and is entirely separate from the second. It is divided into 6 branches. The second and third are slightly joined at the base, but are still to the left of the The fourth and subsequent rays are in the median line. median line and the branchings of the rays gradually become fewer till near the middle of the body they are simple, again showing a dichotomous division towards the posterior end. Longest ray of dorsal equal to that of anal and contained 23 in length of head. Anal ends near caudal, but separate from The right pectoral is longer than the left and about 1 in length of head. The right ventral is slightly longer than the left, the former being on the median line and nearer the head, the distance between the origin of anterior rays of each being equal to $\frac{1}{3}$ the horizontal diameter of the eye. The caudal is rounded and covered with scales to near its posterior margin. There are about 118 scales in the lateral line of the body and 8 on the caudal.

The colour of the specimen is now (in spirit), on the right side, an uniform dark brown with small spots of darker colour on head and anterior region of body. The left side is colourless.

No example of this fish has been found in the numerous trawlings of the Government steamer, and none have been got from fishermen. The single specimen was found in the Museum at Port Elizabeth, the Curator of which kindly handed it over for description. He informed me that it was found in Algoa Bay.

Measurements of the specimen.

Length of body (excl. tail) 345 mm	. Interocular width 85 m	ım.
,, ,, ,, (incl. ,,) +10 ,,	Length of right pectoral 48,	,
Depth of body 134 ,,	,, ,, left ,, 30 ,	,
Breadth of tail 30,	Longest ray of dorsal 30,	,
Length of head 80 ,,	,, ,, ,, anal 30,	,
Diameter of eye (horizontal) 15 ,,	Left ventral 24,	,
,, ,, ,, (vertical) 11 ,,	Right ventral 26,	

SOLEA (PEGUSA) CAPENSIS, n.sp. (Plate IX.)

D. 79-87, A. 63-68, L. 1. 113-115.

Eyes on the right side, upper in advance of lower by about its breadth. Snout hooked, mouth unsymmetrical, extending nearly to below centre of lower eye. Teeth minute, on the blind side only. Gill openings moderately wide, with fringe of papillae along edge. Head, snout, lips and extremity of nostril of blind side covered with papillae. Nostril of blind side dilated and surrounded by space destitute of papillae. Depth of the body is contained nearly 21 in total length (without caudal), length of head $5\frac{1}{2}$. Longitudinal diameter of the eye is contained 5 times in length of head and is about twice the breadth of the interorbital space. The dorsal fin commences well forward on the snout at a point on a level with the centre of the upper eye. The number of rays vary in the different specimens from 79 to 87. The longest of these occurs about the centre and is contained 21 in the length of the head. The posterior extremity of the dorsal is close tothe caudal, but distinct from it. The anal fin commences immediately behind the ventral, and runs backwards, ending close to the caudal as in the case of the dorsal. It contains from 63 to 68 rays. The right pectoral is contained 2\frac{1}{2} times in the length of the head, being slightly longer than the left. It is covered with scales to $\frac{1}{3}$ of its length. The caudal is obtusely rounded and is contained 9½ times in the length of the body. The breadth of the tail, between the extremity of the vertical fins, is about $\frac{1}{2}$ the length of the head.

Scales strongly etenoid on the right side, cycloid on the

left. Lateral line straight with 113-115 scales.

Colour in fresh state, brown, with shades of green, and dark brown and greenish blotches of irregular size and shape, sometimes assuming the form of rings with a brown spot in the centre. These are smaller, more closely set and irregular in shape on the caudal dorsal and anal fins and on the head. The pectoral fin is coloured in a similar manner to about \(\frac{1}{2} \) its length, the distal portion being dark brown and the tips of the rays yellowish white. The iris is of a sandy yellow colour, with black dots, except in its inner margin, where it is of a golden yellow colour. The blind side is colourless, except the papillae, which are ochreous yellow, occasional patches of the same colour appearing on the left side of the unpaired fins, especially the caudal. On these fins also dark streaks appear between the rays. The left pectoral is of a pinkish colour at the base and light brown, sometimes black, on the distal half. In one specimen however this fin was entirely devoid of colour.

This sole is apparently confined almost exclusively to fairly shallow water. Specimens were procured from Fish Hoek and Muizenberg (in False Bay) by seine net. No specimen has been procured in the frequent trawling operations of the Government vessel in this locality, nor to my knowledge in the subsequent trawling operations of other vessels. One specimen only has been procured by the Government steamer, $4\frac{1}{2}$ miles off Cape St. Blaize, in 30 fathoms (mud). It was in a much poorer condition than those caught in the shallow waters of False Bay. Two specimens, said to have been found in Algoa Bay, were procured from the Port Elizabeth Museum.

Length, 338 mm. (including caudal).

BRANCHIOSTOMA CAPENSE, n.sp. (Plate X.)

Myotomes 47+19+9. Length 39 to 48 mm. Dorsal fin low, rays commencing over first myotome, attains its greatest height a little in front of the vertical from the anus and in several specimens shows the characteristic lancet shape of B. lanceolatum, but in others this is not so marked; about the middle of the body its height is $7\frac{1}{2}$ in that of body. anal fin is somewhat deeper than the dorsal and extends from the posterior extremity of the body to the atrial opening, the border being uninterrupted with no trace of the lancet-shaped outline as in the dorsal; it is not continuous with either of the metapleural folds and has fin rays at its base. cirri are 36 in all; the basal pieces forming a ring which is interrupted at the upper part where the last segment on each side bears four very small cirri; the anterior part of the ring falls under the second myotome. The cirri are connected by a low membrane to about \frac{1}{2} of their length. The dorsal fin after passing over the anterior extremity runs along the ventral side into the right buccal fold, the origin of the left buccal fold being thus not in the median line, but on the lett

There appears to be no pigmented spot or "eye" in front of the nerve chord, but there is a series of very distinct black spots running along the top of the chord, beginning from about the 3rd segment and extending to near the posterior end. This line of spots appears broken up roughly into groups, there being a tendency to aggregate at each muscular segment.

In a specimen examined by staining and mounting in balsam there were 30 gonads on the left side, the first in the 18th segment, the last in the 47th. A similar number was

found on the right side.

The species seem to occur on the South and East Coastshaving been found at the following places:—

Locality.	Depth in fms.	Nature of bottom.	No. procured.	Size in mm.
False Bay (Rockland Pt. N.W. 1/4 N., 21/2 miles.)	23	Rock with many sponges.	1	39
False Bay (Roman Rock, N.W. 3/4 N., 3/4 mile.)	18	Sand and shells.	3	42, 42 and brokens specimen.
False Bay (Bakkoven Rock, W. \frac{1}{4} N., \frac{3}{4} mile.)	22	Broken shells.	2	42 and 26.
False Bay (Paulsberg, W.N.W., 1 mile.)	24	Sand and shells.	I	48.
Mossel Bay (Cape St. Blaze, N., 1 mile.)	19.	Fine sand.	4	35, 27, 39 and broken speci- men.
Algoa Bay (Lat. 33°, 52', 30" S., Long. 25°, 50', 33" E.)	25	Fine sand.	2	38 and 39.
Algoa Bay (Lat. 34°, 2' S., Long. 25°, 45', 30" E.)	29	Fine sand.	3	39, 47 and broken specimen.

The majority of the specimens secured were unfortunately so damaged in the dredge that a careful comparison of the number of segments in all was found impossible. It is probable, however, that subsequent dredgings will produce them in abundance now that their habitat is known.

They have not yet been found in the colder waters of the West coast. In addition to these specimens procured by the Government steamer I found one in the collection of the South African Museum, which I am informed by the Assistant Director, Mr. Péringuey, was procured about 20

years ago from Simon's Bay.

The occurrence of Branchiostoma in South African waters is interesting as filling an important gap in the geographical distribution of this interesting form. The following table, containing the names of the known species with the approximate number of myotomes and place of occurrence, will indicate the taxonomic position of this new form as based upon the number of myotomes and also its relative geographical position:—

Species of Brachiostoma.	No. of Myotomes.	Distribution.
B. cultellum	32+11+10=53	(N. Australia.) E. Australia. (S. America.
B. caribaeum	35+14+9=58	S. United States. Antilles.
B. lanceolatum	36+14+12=62	(Europe. Chesapeake Bay?
B. cingalense B. nakagawae	39+17+6=62 37+16+11=64	Ceylon. Japan.
B. belcheri	37 + 14 + 13 = 64	(Borneo.) N. Australia.
B. lucayanum B. pelagicum B. californiense B. bassanum	44 + 9 + 13 = 66 $36 + 16 + 15 = 67$ $44 + 16 + 9 = 69$ $44 + 13 + 18 = 75$	Bahamas. Honolulu. California. S. Australia.
B. capense B. elongatum	47 + 19 + 9 = 75 49 + 18 + 12 = 79	S. Africa. Peru.

It would appear from this table that the African form somewhat resembles B. bassanum, Günth., both from the similarity of the number of myotomes (75 in all in both cases) and geographical position, the most distinctive difference being in the number of myotomes of the caudal region.

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